

# (12) UK Patent Application (19) GB (11) 2 270 638 (13) A

(43) Date of A Publication 23.03.1994

(21) Application No 9219823.3

(22) Date of Filing 18.09.1992

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(51) INT CL<sup>5</sup>

F24C 15/20

(52) UK CL (Edition M)

B1T TNFG TNRU

U1S S1887 S2400

(56) Documents Cited

US 3805685 A

(58) Field of Search

UK CL (Edition L) B1T TNRU

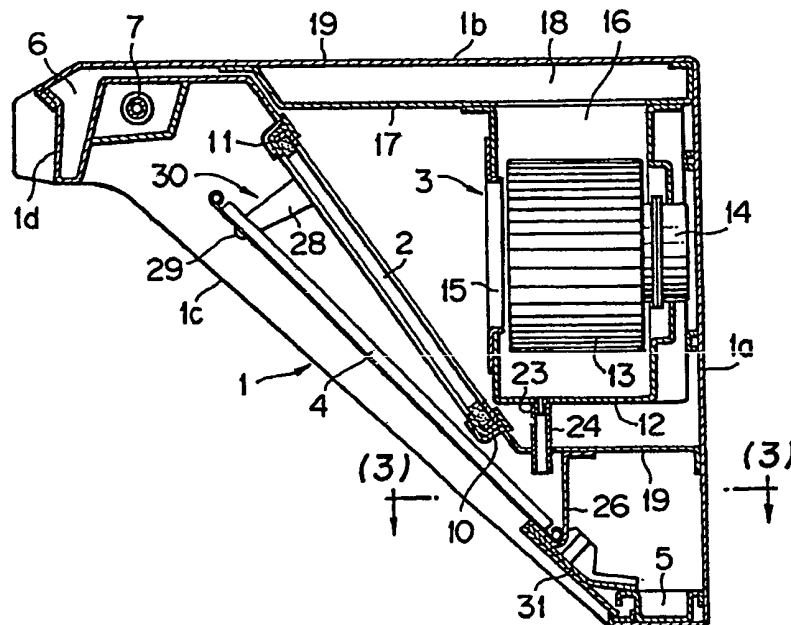
INT CL<sup>5</sup> F24C 15/20

ONLINE DATABASE:WPI

(54) Range hood

(57) A range hood comprises a housing of generally triangular cross section with an open front bridged by a removable metal filter 2 and enclosing an extractor fan 13 which draws air through the filter to an upper outlet space 18. A metal shield 4 in front of the filter defines with the housing an inlet gap extending above and to each side of the shield. Shield 4 catches oil dripping from the filter and directs it to oil pan 5. Duct 24 delivers any oil caught in fan casing 12 to pan 5. The shield 4 is shown as fixed, but it can be pivotally mounted. In Fig. 5 a fusible link and a tension spring enable the shield to close against the filter in the event of fire, also stopping the fan 13 and sounding an alarm. In Figs. 6, 7 a motor driven screw pivots the shield in the event of fire or when fan 13 is switched off.

FIG. 1



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FIG. 1

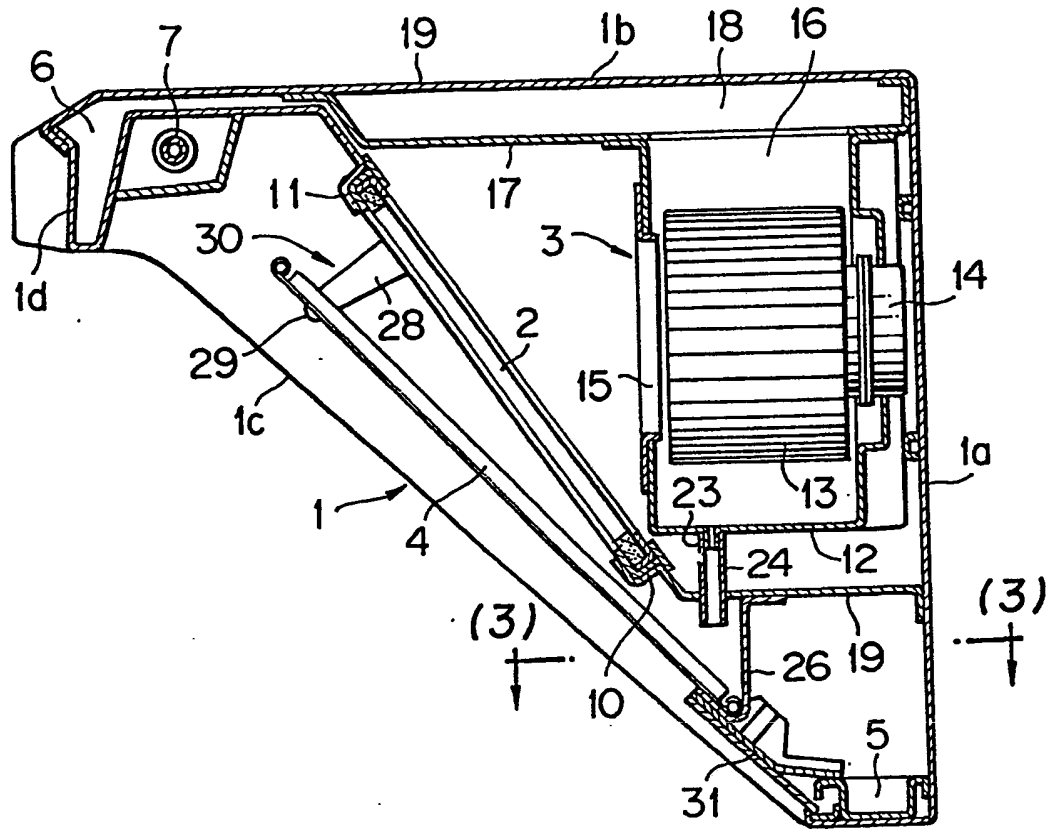


FIG. 4

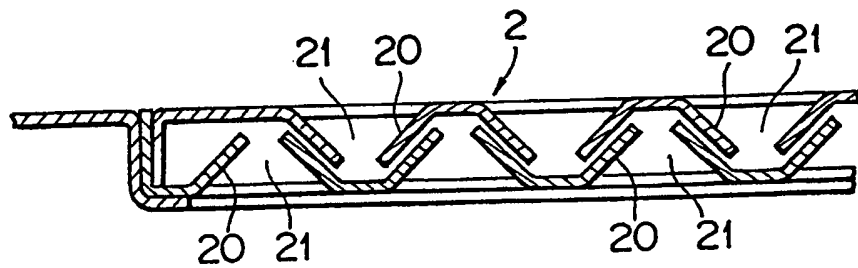


FIG. 2

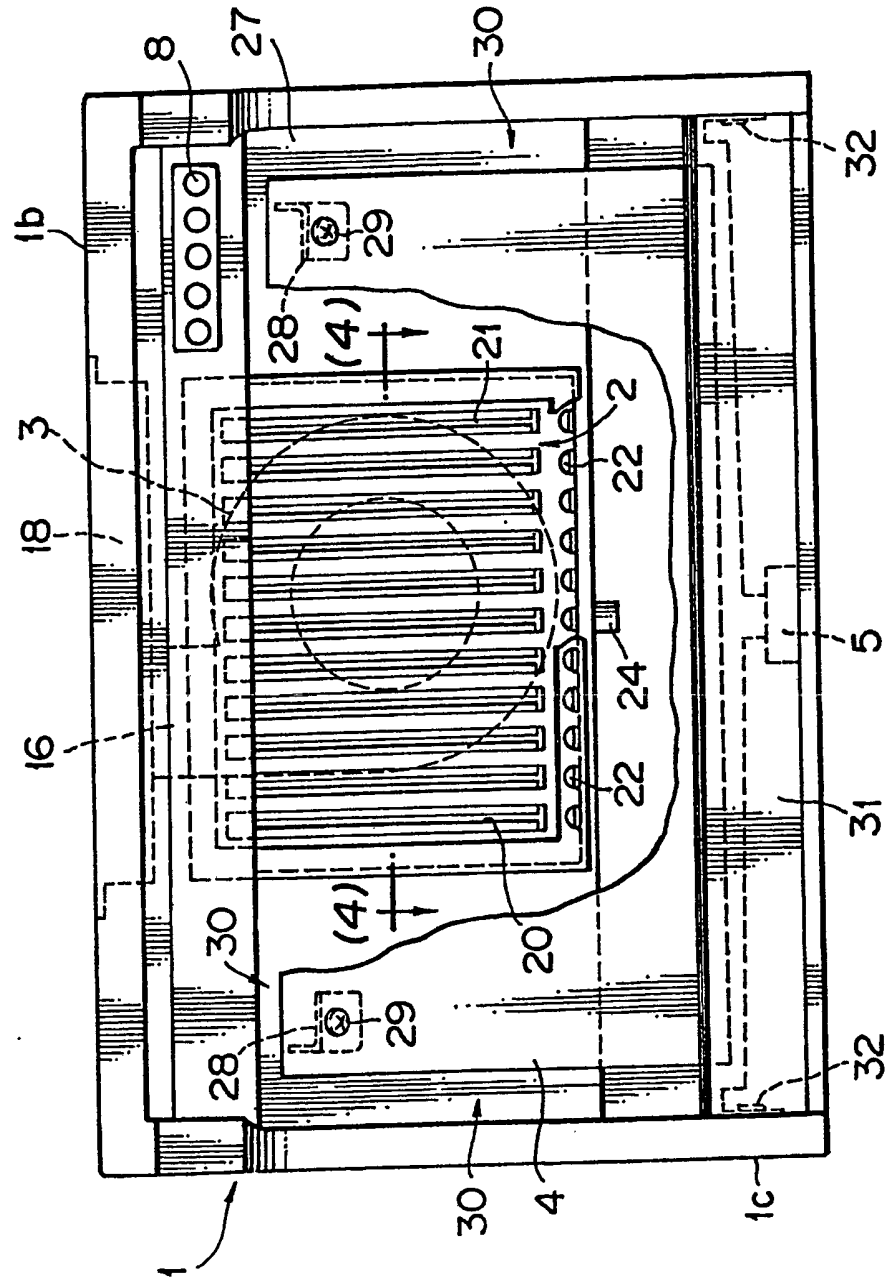


FIG. 3

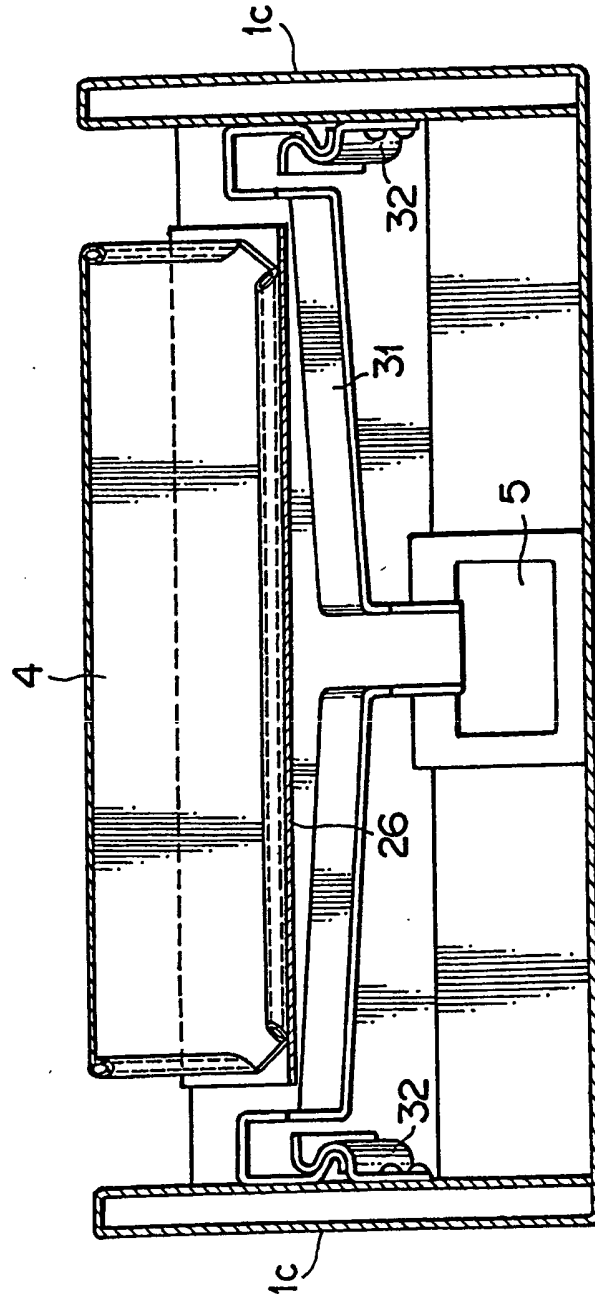
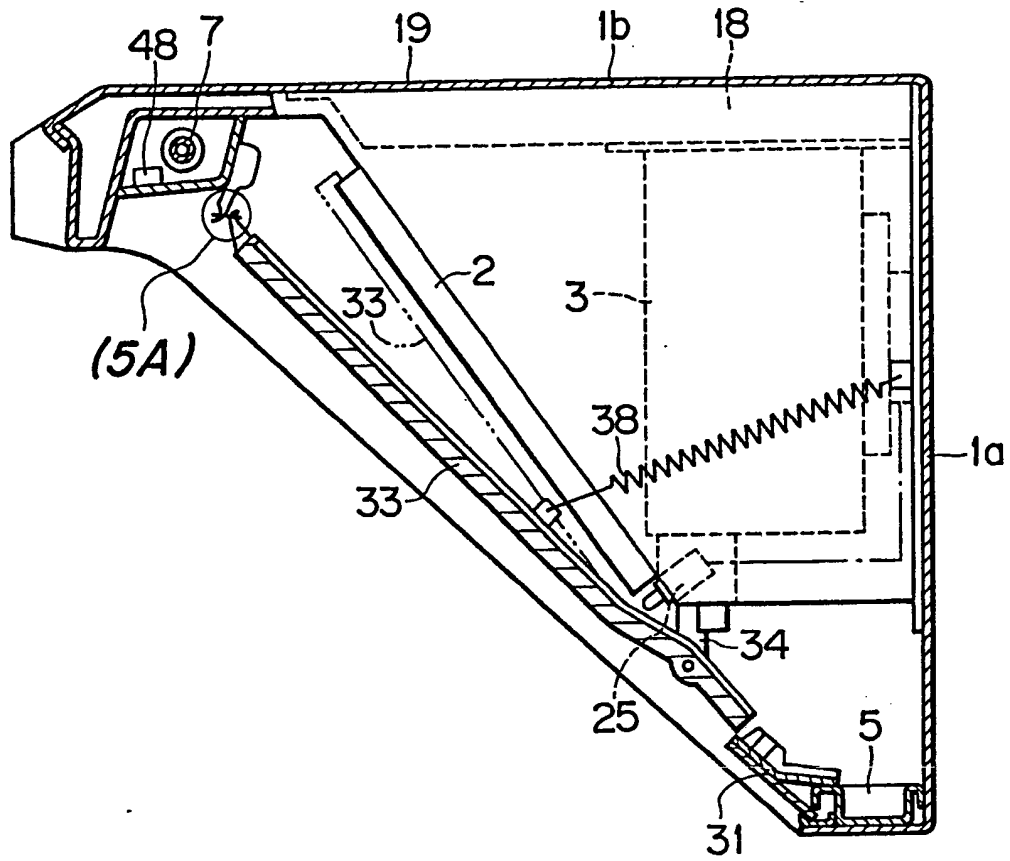


FIG. 5



**FIG. 5A**

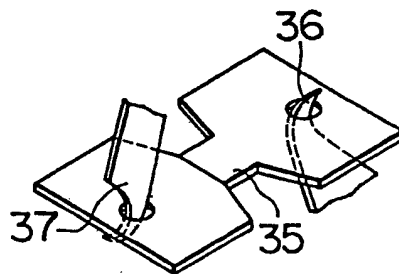


FIG. 6

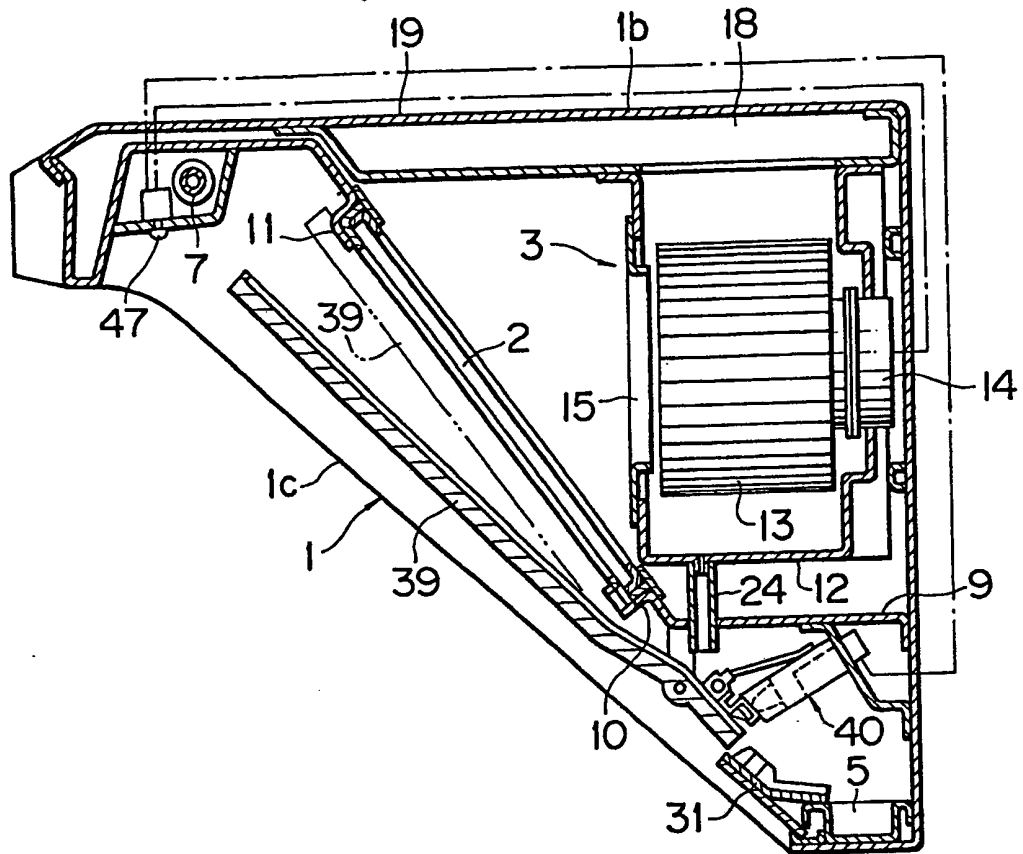
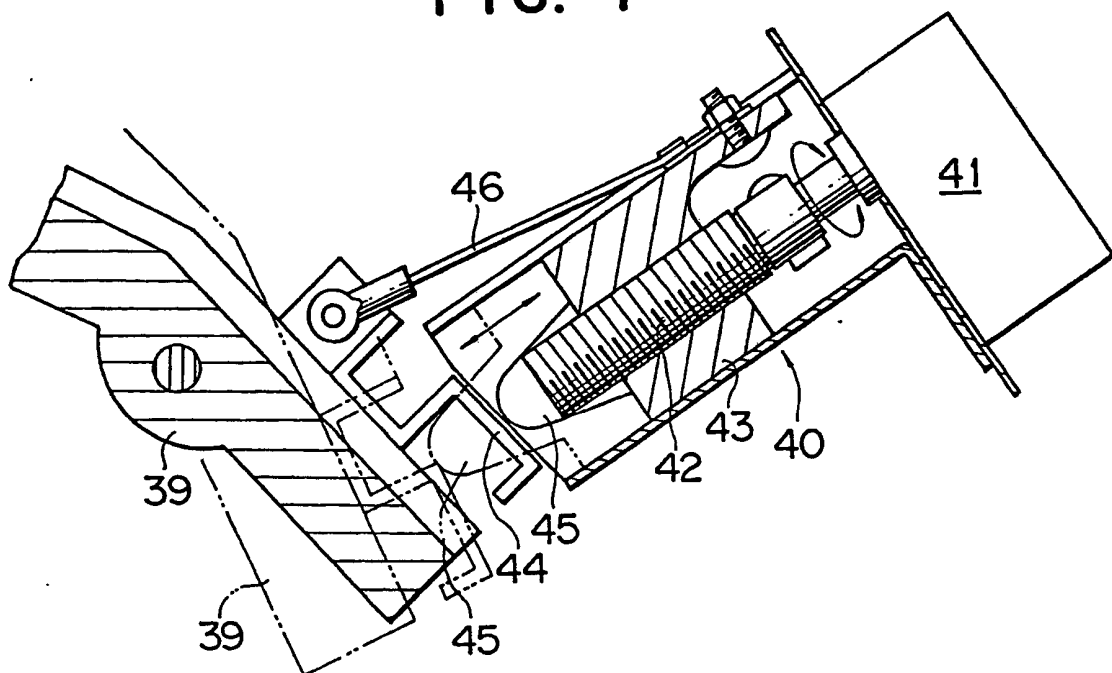


FIG. 7



## RANGE HOOD

## BACKGROUND OF THE INVENTION

## Field of the Invention

The present invention relates to a range hood installed above a gas range or electric range in a kitchen for sucking smoke, smell, combustion gas and the like generated in cooking and exhausting them to the interior or exterior.

## Description of the Prior Art

There has been generally known such a range hood as accommodating a fan unit in a deep type of hood main body composed of a box body with the front and lower surfaces being opened, wherein a front board is attached to the opened front surface to close it. This is disclosed, for example, in Japanese Utility Model No. Sho 63-15711.

More specifically, the above range hood has a structure of fixing a lower board between the back board and the right and left boards of the hood main body with the lower surface being opened, and mounting a filter between the leading edge of the lower board and a filter insertion frame attached on the lower surface of a top board of the hood main body, whereby accommodating a fan unit in a space defined by the filter, lower board, and the back board, right and left side boards and top board of the hood main body.

The range hood of this type installed above the gas range orelectric range is disadvantageous that, in the case of being

installed on the lower ceiling or on the lower side of a wall cabinet, there occurs such a trouble in working that the lower portion of the front side of the right and left rectangular side boards of the hood main body tends to be touched with the head portion of a cook.

Also, in the above mentioned range hood, the whole surface of the filter disposed in front of the suction port of the fan unit faces to the lower opening of the hood main body and the suction force exerts on the whole area of the lower opening by activation of the fan unit. However, since the suction port (bell mouth) of the fan unit is positioned almost at the central portion of the opening, the suction effect near the central portion of the opening is preferable but the suction effect around the opening is reduced. Accordingly, smoke, smell, combustion gas and the like are not caught so entirely within the hood and leaked outside the hood to be thus stayed near the ceiling of the interior. The catching efficiency is due to not only the performance of the range hood but also the fact that the combustion gas, smoke and the like generated in cooking using the range tend to rise and diffuse crosswisely.

Further, fats and oils contained in smoke generated in cooking are made to pass through the filter to be thus stuck and recovered; however, the fats and oils stuck on the filter cannot be simply removed by cleaning, and consequently, the filter is excessively used until its function is harmed or it is exchanged by the new one at the suitable time. Also, since the filter stuck



with the fats and oils is exposed from the lower opening of the hood main body, if the food should be fired, the flame rising from the food is touched to the filter thus causing a fire.

#### SUMMARY OF THE INVENTION

Taking the above into consideration, the present invention has been made, and an object is to provide a range hood capable of effectively guiding and catching combustion gas, smoke and the like generated at the range and rising therefrom to a fan unit.

Another object of the present invention is to provide a range hood capable of eliminating a trouble in cooking even when being disposed near a gas range or electric range.

A further object of the present invention is to provide a range hood capable of easily cleaning a filter and recovering fats and oils stuck with the filter and shook off by a fan.

A still further object of the present invention is to provide a range hood capable of shielding the filter surface from the flame in the case of an abnormality such as rising of the flame from the food thus preventing occurrence of a fire.

To solve the above objects, in a preferred mode of the present invention, there is provided a range hood comprising: a hood main body including a back board, top board, and right and left side boards wherein each shape of side surfaces is approximately triangular and the front side is opened; a metal made filter removably disposed in the hood main body oppositely to the

opening of the hood main body; a fan unit accommodated in a space defined by the metal filter within the hood main body; a metal made shielding board positioned in front of the surface of the metal filter with a specified interval for covering the filter and defining a specified suction gap between the right and left side boards and the top board constituting the hood main body; an oil pan disposed on the bottom portion of the hood main body for guiding and recovering fats and oils stuck within the metal made filter and the fan unit; and an exhaust port communicated to a discharge port of the fan unit provided on the upper surface of the top board of the hood main body.

In another preferred mode, the above shielding board is so constructed that, the lower portion positioned downwardly from the lower edge of the filter is rotatably supported by a fixed side member including the hood main body and is automatically opened or closed by a mechanically driving mechanism utilizing the tensile strength of a coil spring or rotating force of a motor.

In a further preferred mode, the above range hood main body is provided with a detecting sensor for detecting an abnormal high temperature rise and a fire and an alarm buzzer activated in association with the abnormality detection of the detecting sensor. Also, the above detecting sensor comprises a thermal fuse and is engaged between the upper portion of the front side of the hood main body and the upper portion of the shielding board having the lower portion serving as the turning center. Further, a spring for

turnably energizing the shielding board on the metal made filter side provided to be stretched between the shielding board and the hood main body for automatically closing the shielding board according to the detection of the abnormal temperature. The above detecting sensor may include a temperature sensor or gas sensor.

In a still further preferred mode, in the case of employing the mechanically driving mechanism utilizing a motor as a mechanism for opening or closing the above shielding board, it is associated with the switch for operating or stopping the fan unit.

In the above means, each shape of the side surfaces of the hood main body is almost right-angled triangular, and thereby, it is possible to eliminate obstruction of right and left side boards of the hood main body to a cook standing at the lower portion of the front side of the range hood and to hence secure the sufficient working space. Further, since the shape of the right and left side boards is almost right angled triangular, that is, the surrounding area in the side surfaces are small, smoke is liable to be leaked to the right and left sides; however, by defining the suction gap between the right and left side boards of the hood main body and the right and left side peripheries and by covering the others, the suction speed of the wind generated in the suction gap is made higher, so that it is possible to improve the catching effect on the peripheral portion of the hood main body and to hence make the leakage of the smoke small.

Also, fats and oils contained in the smoke are made to pass

through the metal made filter to be thus stuck thereon, and fats and oils shook off by the fan flow along the back surface of the shielding board and are guided and recovered in the oil pan disposed on the bottom portion of the hood main body. The oil pan can be taken from the hood main body and the recovered fats and oils can be simply disused.

Further, as the detecting sensor provided on the hood main body detects the abnormal temperature rise and the abnormal temperature due to a fire from the food, the alarm buzzer is activated to thus inform such a dangerous state to the cook. Also, in the range hood wherein the above shielding board is opened or closed by turning in front and in rear, the filter surface is closed in association with the abnormality detection of the detecting sensor for preventing occurrence of a fire.

Also, in the range hood wherein the above shielding board is opened or closed by the mechanically driving mechanism utilizing the rotation of the motor, by the operation of the drive mechanism in association with the operating switches of the operation or stoppage of the fan unit, the shielding board is automatically opened or closed. In addition, in this case, the smoke, combustion gas and the like are exhausted to the exterior. When the range hood is unnecessary, the filter surface serving as the communication port to the interior is closed so that the outside air and noise in the exterior are prevented from flowing in the interior.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a vertical cross-sectional side view showing a first embodiment of a range hood according to the present invention;

Fig. 2 is a front view partly broken away of Fig. 1;

Fig. 3 is an enlarged cross-sectional view taken on line (3) - (3) of Fig. 1;

Fig. 4 is an enlarged cross-sectional view taken on line (4) - (4) of Fig. 2;

Fig. 5 is a vertical cross-sectional side view showing a second embodiment of a range hood according to the present invention;

Fig. 6 is a vertical cross-sectional view showing a third embodiment of a range hood according to the present invention; and

Fig. 7 is an enlarged view of a mechanically driving mechanism of Fig. 6.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings.

Referring to Figs. 1 to 4, there is shown a range hood of circulation for interior exhaust. In these figures, numeral 1 indicates a hood main body, 2 is a filter, 3 is a fan unit, 4 is a shielding board, and 5 is an oil pan.

The hood main body 1 is composed of a back board 1a and a top board 1b each being rectangular shaped, and a right and left side boards 1c each being approximately triangular shaped, wherein the front side is opened and each of side surfaces is approximately triangular shaped. A front cover 1d is attached at the leading edge of the top board 1b for defining an accommodating portion 6 for accommodating switches and a lighting lamp. Also, switch buttons 8 for the fan unit 3 (operation, stoppage and switching of the rotational speed) and for the lighting lamp 7 set in the accommodating portion are disposed in the front surface of the hood main body 1.

In front of the lower portion of the back board 1a of the above hood main body 1, a bottom board 9 is rigidly fixed in such a manner as to be projected ahead in the horizontal direction. In the bottom board 9, both the right and left sides are rigidly fixed on the right and left side boards 1c, respectively. Further, the front side of the bottom board 9 is folded upwardly and at the leading edge thereof, an insertion portion 10 for supporting the lower edge of the metal made filter 2 is formed.

A supporting frame 11 is rigidly fixed on the lower surface of the front side of the top board 1b oppositely to the insertion portion 10 of the bottom board 9, and the metal made filter 2 is removably mounted between the supporting frame 11 and the insertion portion 10 of the bottom board 9.

The fan unit 3 is accommodated in a space defined by the

back board 1a, top board 1b, right and left side boards 1c, bottom board 9, and filter 2. The fan unit 3 is composed of a fan casing 12, fan 13 and motor 14. A bell mouth 15 is attached on the front surface of the fan casing 12 to thus form a suction port. The discharge port 16 of the fan casing 12 is communicated to an exhausting chamber 18 defined by a partitioning plate 17 provided inside the top board 1b. The top board 1b, that is, the upper surface of the exhausting chamber 18 is provided with a plurality of exhausting holes 19 for the interior exhausting.

The metal made filter 2 is formed by assembling a pair of filter members 2. The filter member 2 is so constructed as providing slits 20 on a metal made flat plate in a rectangular shape in such a manner as to be parallel to and spaced apart from each other, wherein each tongue piece defined by the slits 20 is folded inwardly to thus form a ventilation port 21, and the peripheral edge of the flat plate is folded at right angles. In addition, the ventilation ports 21 on the front side and the rear side are alternately positioned so as to stick and recover fats and oils passing through the filter. Also, through-holes 22 are provided on the lower end of the metal made filter 2 for allowing the oil stuck and recovered by the filter 2 to flow to the insertion portion 10 side.

An oil discharge hole 23 is provided on the lowermost portion of the fan casing 12 of the fan unit 3, and a tube 24 is connected to the oil discharge hole 23 so as to be suspended

downwardly from the fan casing 12. Consequently, fats and oils shook off by the fan 13 are reserved in the fan casing 12 and are made to be dropped from the oil discharge hole 23 to the back surface of the shielding board 4 through the tube 24.

The shielding board 4 is so constructed as forming a metal flat plate in a rectangular shape, and curling the peripheral edge of thereof and cutting-out both the lower ends, to thereby guide downwardly the oil dropped on the back surface of the shielding board to the oil pan 5 through an oil receiving cover 31. As for the shielding board 4, the lower portion is fitted into a receiving frame 26 suspendedly fixed on the lower side of the bottom board 9, and the upper portion is removably fixed to a leg seat 28 erected and fixed in front of a peripheral frame 27 for supporting the metal made filter 2 by a screw 29. With the height of the leg seat 28, the shielding board 4 is supported separately from the surface of the metal made filter 2 at a specified interval. Further, a narrow suction gap 30 is defined between the shielding board 4, right and left side boards 1c and top board 1b.

In front of the lower portion of the shielding board 4, the oil receiving cover 31 is removably engaged with hooks 32 respectively fixed on the right and left side boards 1c. The oil receiving cover 31 is inclined downwardly from both the right and left sides to the central portion and is provided with a guide passage projected from the central portion to the oil pan 5 so as to guide the oil dropped from both the right and left sides of the



receiving frame 26 to the oil pan 5.

With this construction, the suction speed of the wind generated in a narrow suction gap 30 defined between the right and left side boards 1b and top board 1c, and the peripheral edge of the shielding board 4 is made higher by operation of the fan unit 3. Consequently, smoke or the like caught and sucked by the sucked wind is made to pass through the metal made filter 2 and sucked in the fan casing of the fan unit 3, and fats and oils caught by the metal made filter 2 and the fan unit 3 flow along the back surface of the shielding board 4, and are recovered to the oil pan 5 through the receiving frame 26 and the oil receiving cover 31.

The above embodiment has been described with respect to the type of the interior exhaust from the discharge port of the fan unit. However, the exterior exhaust is made possible by connecting the exhaust duct to the discharge port and projecting the leading edge of the exhaust duct to the exterior.

Although, the shielding board in the above embodiment is kept to be separated from the metal made filter at a specified interval, it may be turned in front and in rear to open or close the metal made filter 2 surface. Hereinafter, the embodiment of this type will be explained with reference to the accompanying drawings. In addition, parts corresponding to those in the previous embodiment are indicated at the same numerals and the explanation thereof is omitted.

Fig. 5 shows such an embodiment as automatically turning and

closing the shielding board when the abnormal temperature rise is detected in cooking. In a shielding board 33 having the same construction as that in the previous embodiment, the lower portion is turnably attached on an attaching piece 34 of the hood main body 1 side. Also, hook portions 36 and 37 for stretching a thermal fuse 35 are respectively provided on the upper end of the shielding board 33 and the lower surface of the top board 1c. Further, a coil spring 38 for energizing the shielding board 33 in the closed direction is stretched between the position upwardly from the portion to which the shielding board 33 is turnably attached and the back board 1a. By stretching the thermal fuse 35 between the hook portion 36 of the shielding board 33 and the hook portion 37 of the hood main body 1 side, the shielding board 33 is held in the state of being apart from the metal made filter 2 surface. When the thermal fuse 35 is cut-off by the abnormal high temperature, the shielding board 33 is closed by the tensile strength of the coil spring 38. Accordingly, if the food should be fired, the flame is prevented from being touched to the metal made filter 2 stuck with the fats and oils, thereby preventing occurrence of a fire. In addition, it is possible to stop operation of the fan unit 3 by utilizing the turning and closing action of the shielding board, and to activate the switch 25 for operating an alarm buzzer 48 for informing the abnormality. Also, in the embodiment as shown in Fig. 5, when the thermal fuse is cut-off, the new thermal fuse must be reset by manually turning the shielding board.

Fig. 6 shows another embodiment capable of automatically performing the reset of the shielding board turned and closed, and of automatically closing it by detecting the abnormal temperature rise. In this case, a mechanically driving mechanism 40 is provided between the back surface position downwardly from the turning center of a shielding board 39 turnably attached in the same manner as shown in Fig. 5 and the lower side of the bottom board 9 of the hood main body 1. The mechanically driving mechanism 40 is operated according to the abnormality detecting signal from a detecting sensor 47 attached on the lower surface of the front board 1d of the hood main body 1, to thus open and close the shielding board 39. The mechanically driving mechanism 40 is so constructed as shown, for example, in Fig. 7. In this figure, a screw shaft 42 is connected to the rotating shaft of a motor 41, and a movable body 43 screwed with the screw shaft 42 is rotation-stopped to be thus movable in the axial direction. A pressing portion 45 contacted with the pressure receiving plate 44 fixed on the back surface of the shielding board 39 to press the movable body 43 is provided on the front surface of the movable body 43. Further, the movable body 43 is connected to the shielding board 39 by a flexible wire 46.

Thereby, as the motor 41 is rotated and the screw shaft 42 is rotated to move the movable body 43 forwardly, the pressing portion 45 of the movable body 43 is in contact with the pressure receiving plate 44 of the shielding board 39 to rotate the portion

downwardly from the turning center forwardly and to rotate the portion upwardly from the turning center on the metal made filter 2 side thus closing the front surface of the filter. Also, as the motor 41 is rotated reversely, the movable body 43 is moved backwardly along the screw shaft 42, and thus the shielding board 39 is rotated by a wire 46 such that the portion downwardly from the turning center is stretched backwardly, so that the shielding board 39 is separated from the metal made filter 2 to be opened. In this case, the ON/OFF of the motor 41 is not controlled by only the signal from the detecting sensor 47, but may be operated in association with the operation or stoppage of the fan unit 3. In such a case, in starting and termination, the opening or closing of the shielding board is very convenient to be automatically made.

In each embodiment mentioned above, the range hood is attached on the lower side of the wall cabinet, or in the case of no wall cabinet, on the portion with the same height as the above. Accordingly, the upper surface of the top board of the hood main body almost corresponds in height to the eye of a cook, that is, within the arm's length, and therefore, it can be used as a place to put spices. In this case, a handrail may be attached along the peripheral edge of the upper surface of the top board for preventing the spices put on the upper surface of the top board from being dropped.

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shielding board is rotatably supported at the lower portion thereof, and is turned backwardly in association with the abnormality detection of said detecting sensor thereby closing the surface of said metal made filter.

4. A range hood according to claim 3, wherein said detecting sensor comprises a thermal fuse and is engaged between the upper portion of the front side of said hood main body and the upper portion of said shielding board having the lower portion serving as the turning center, and a spring for turnably energizing said shielding board on said metal made filter side provided to be stretched between said shielding board and said hood main body.

5. A range hood according to claim 1, wherein said shielding board is turned in front and in rear by a drive mechanism utilizing a motor and said turning motion is associated with the operation or stoppage of said fan unit.

Patents Act 1977

Examiner's report to the Comptroller under  
Section 17 (The Search Report)

Application number

GB 9219823.3

Relevant Technical fields

(i) UK Cl (Edition L ) B1T (TNRU)

(ii) Int Cl (Edition 5 ) F24C 15/20

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

R T HAINES

Date of Search

4 FEBRUARY 1993

Documents considered relevant following a search in respect of claims 1-5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	US 3805685 (CAMS)	1

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